

MARIO MORI (*) & MARINO VACCHI (**)

ON A NEW OCCURRENCE OF THE ALIEN FLAT CRAB,
PERCNON GIBBESI (H. MILNE EDWARDS), IN THE
 SOUTHERN SICILY
 (CENTRAL MEDITERRANEAN SEA)

(CRUSTACEA, BRACHYURA, GRAPSIDAE)

The passive dispersal by human activity of coastal organisms across all the seas has been an active and dynamic process since at least the nineteenth century, and has led to the alteration of many shallow-water plankton and benthic communities. Biological invasions in natural marine communities occur through two processes, range expansions and introductions (CARLTON, 1987). Range expansions consist of dispersal by natural mechanisms into a region where the species did not formerly exist. Introductions consist of transportation by human activity into a region where the species did not formerly exist. Introductions of alien organisms have been linked to fouling and boring communities on ships, ballast seawater from ships, semi-submersible exploratory drilling platforms, and aquaculture (CARLTON, 1987; HICKS & TUNNELL, 1993).

The introduction of a non-native species, also known as an alien, exotic or bioinvader, does not necessarily spell doom for a habitat, but it can disrupt a delicate balance (JAMIESON *et al.*, 1998). An alien species may find few predators allowing it to swiftly multiply, monopolize food sources, and crowd out native inhabitants (ELTON, 2000). Green crabs, *Carcinus maenas* (L.), are one example (McDONALD *et al.*, 1998).

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The alien species of decapod crustaceans found in Mediterranean have been recently listed by UDEKEM d'ACQZ (1999). This paper describes the discovery of an alien crab species in the southern Sicily (Central Mediterranean).

MATERIALS

On 5 August 1999 M. Vacchi, while diving for fish census, observed among the artificial reefs of Porto Palo di Capo Passero (southern Sicily, Central Mediterranean) (Fig. 1) numerous individuals of an unknown grapsid species among which two ovigerous females incubating a great number of embryos were also present. During subsequent investigations, performed on 27 November 2000, M. Vacchi succeeded in capture of two individuals of both sexes of the same species.

Measurements in mm taken: male, carapace length excluding rostrum (CL) 29.5; carapace width (CW) 29; propodus length (PLP) and width (PWP) of the first pereopod 14 and 9, respectively; maximum width of the 5th abdominal segment (AbW) 10.7; female, CL 29, CW 28.2, PLP damaged, PWP damaged, about 4, AbW 23.

Their morphology agrees with the descriptions provided by MANNING & HOLTHUIS (1981) and WILLIAMS (1984) for *Percnon gibbesi* (H. Milne Edwards, 1853) (Fig. 2). The specimens are deposited in the Museo Civico di Storia Naturale "G. Doria" of Genova.

DISTRIBUTION, HABITAT AND BIOLOGY OF *PERCNON GIBBESI*

According to WILLIAMS (1984) the type locality of this grapsid crab are the Antilles, although it is distributed from both sides of the Atlantic and from California to Chile in the eastern Pacific. In the western Atlantic it ranges from Florida to Brazil, and in the eastern Atlantic from Madeira, the Azores, and Morocco to Ghana (MANNING & HOLTHUIS, 1981). The usual habitat for this species is underside of rocks at the low-tide level or in dense algal canopies, between 0 and 29 m depth (MANNING & HOLTHUIS, 1981; WILLIAMS, 1984; GONZÁLEZ PÉREZ, 1995). Male *P. gibbesi* attains a maximum carapace length of 30 mm, female 33 mm. Ovigerous females are known from February to September (WILLIAMS, 1984; MANNING & HOLTHUIS, 1981).



Fig. 1 - Map of the area showing the sites (closed circle) where the individuals of the alien grapsid crab, *Percnon gibbesi*, have been found: Linosa Island (Relini *et al.*, 2000) and Porto Palo di Capo Passero (this paper).

REMARKS

A consistent number of specimens of both sexes of *P. gibbesi* (30-40 individuals) was observed throughout the artificial reefs of Porto Palo di Capo Passero between 0 and 6 m, i.e. to the maximum depth inspected. The habitat agrees with that known for this grapsid species.

The propodus chela of male was larger than in female. In many brachyuran species, the secondary sexual characteristics, as the chelae of males, occur at the puberty moult (HARTNOLL, 1974). The morphology of the chelae in the brachyurans is very important due to the wide variety of behavioural interactions such as feeding habits, agonistic interactions and courtship behaviour (SCHMALFUSS, 1976; HARTNOLL, 1982). Mating in all grapsid crabs that have been examined to date

occurs when the female is in a hard condition, with the exception of *Pachygrapsus crassipes* Randall (HARTNOLL, 1969). In these species the males don't perform any premating embrace, they compete in ways that maximize the rate they encounter females but neither defend females nor resources (CHRISTY, 1987). During the nuptial courtship, a female in a hard condition and often larger than males could result dangerous for her own partners. Probably the appearance of big chelae reduces both the aggressiveness of the female and the interactions with other males.

The ovigerous females of *P. gibbesi* observed in the field suggest that the Sicilian population already represents a self-maintaining, proliferating population, inhabiting the Porto Palo di Capo Passero waters, probably, by various years. Such hypothesis is also supported by the characteristics of the collected specimens. In fact, the body dimensions (about 29 mm CL) and the sexual secondary characters as male chelae size, morphology both of the first male pleopod and of the female genital opening, indicate that they were adult individuals and at least three years old.

At home the period of reproductive activity of *P. gibbesi* is wide and probably, as other grapsid species (SPIVAK *et al.*, 1996), this crab produces several egg clutches for year. This pattern allows to suppose that *P. gibbesi* could easily colonize both other areas and isles of the central and southern Mediterranean. Its presence was recorded for the first time in Mediterranean by RELINI *et al.* (2000) at Linosa, an island situated to south-western of Porto Palo di Capo Passero (Central Mediterranean) (Fig. 1). These authors hypothesize that the larvae of this grapsid have been transported in the Sicily straits by one of the branch currents that enter from Gibraltar. However, it is also possible that the introductions of *P. gibbesi* could been linked to fouling and boring communities on ships and ballast seawater from ships, as is already occurred in Mediterranean for other alien species, as e.g. *Thalassidroma gloriensis* Crosnier (RELINI ORSI & MORI, 1979).

P. gibbesi should not be considered only as a valuable addition, because the alien species often cause ecological imbalances with rapid and dramatic consequences (JAMIESON *et al.*, 1998; McDONALD *et al.*, 1998; ELTON, 2000). So, some monitoring measures are needed to document the impact of this alien species on local ecosystems.

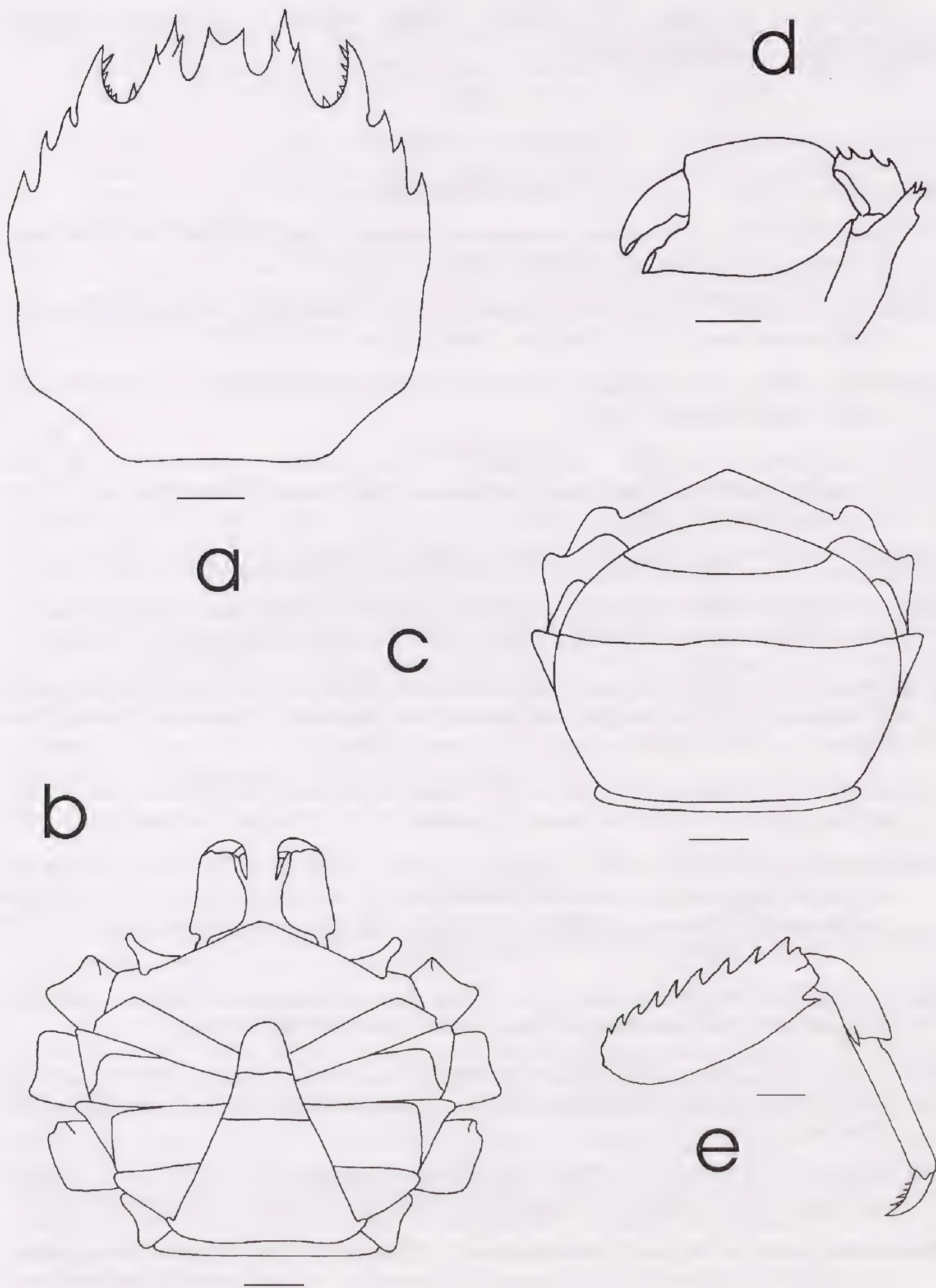


Fig. 2 - *Percnon gibbesi*. a: male carapace in dorsal view; b and c: male and female telson and associated structures in ventral view, respectively; d: left male chela; e: 5th right female pereopod. Scale bars=5 mm.

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SUMMARY

Numerous specimens of both sexes of the alien flat crab, *Percnon gibbesi* (H. Milne Edwards, 1853), were observed throughout the artificial reefs of Porto Palo di Capo Passero (southern Sicily, Central Mediterranean). The body dimension and the morphology of the sexual secondary characters of the collected specimens indicated that they were adult individuals. This characteristic together with the presence of ovigerous females allows to suppose that the Sicilian population of *Percnon gibbesi* already represents a self-maintaining, proliferating population, probably, inhabiting the Porto Palo waters by various years. This grapsid crab should not be considered only as a valuable addition, because the alien species often cause ecological imbalances with rapid and dramatic consequences. So, some monitoring measures are needed to document the impact of this alien species on local ecosystems.

RIASSUNTO

Presenza del granchio piatto alieno, *Percnon gibbesi* (H. Milne Edwards), nella Sicilia meridionale (Mediterraneo Centrale)

Viene segnalata la presenza di numerosi individui del granchio piatto alieno, *Percnon gibbesi* (H. Milne Edwards), lungo le barriere frangiflutti di Porto Palo di Capo Passero (Sicilia meridionale, Mediterraneo centrale). Le dimensioni del corpo e la morfologia dei caratteri sessuali secondari degli esemplari raccolti indicavano che essi erano individui adulti. Questi dati uniti alla presenza di femmine ovigere permette di supporre che *Percnon gibbesi* abiti le acque siciliane da diversi anni. Sebbene il ritrovamento di questo granchio risulti interessante, tuttavia questa specie aliena potrebbe causare degli squilibri ecologici con rapide e drammatiche conseguenze. Si rendono così necessarie delle misure di monitoraggio che documentino l'impatto di questa specie aliena sugli ecosistemi locali.

